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| <p>The Eleventh International Conference on Laser Spectroscopy, held June 10-15, 1993 encompassed the following areas of laser spectroscopy, high resolution spectroscopy of atoms and molecules squeezed states of light and their applications, time domain spectroscopy, atomic wavepackets, far infrared spectroscopy based on picosecond pulses, gain without inversion, and the interaction of atoms with intense laser pulses.</p> | | |
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Final Technical Report

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The Eleventh International Conference on Laser Spectroscopy was held June 10-15 in Hot Springs, Virginia. The current topics in laser spectroscopy were featured in the program. The program included laser cooling and trapping, both of neutral atoms and ions, with photo association spectroscopy and interference in the fluorescence from two ions in a trap being some of the more noteworthy features. Recent progress in the related area of atom interferometry was also reviewed. The program included the most recent advances in high resolution spectroscopy including measurements of the Rydberg constant and high resolution spectroscopy of molecules, both stable forms and free radicals.

Time resolved spectroscopy received more attention than is usually the case for this conference. The use of the coherence in the broadband noise of a split laser pulse as well as a new Ramsey interference method for doing wavepacket experiments were discussed. A related technique, using a picosecond laser pulse to rapidly turn on the current in a GaAs wafer to generate broadband short FIR pulses, was also discussed. The uses of these pulses for molecular spectroscopy and as high intensity half cycle pulse ionize to excited atoms were described.

A timely topic covered at the conference was the interaction of atoms with intense laser fields. The transition between traditional multiphoton ionization and field ionization was described. An interpretation of transient resonant enhancements of multiphoton ionization in terms of the evolution of dressed atomic states was presented, clarifying an issue which had been a subject of some debate. Finally, the first observation of stabilization of atoms in an intense laser field was reported. The use of laser spectroscopy in more practical contexts was also covered. Applications included spectroscopic diagnostics of combustion and surface dynamics, environmental sensing, imaging using x rays from laser generated plasmas, and using squeezed light for communications.

Finally, the experimental observation of amplification without inversion was described. It is another example of a common theme which runs through many of the topics covered in the conference, the importance of coherence. In the earliest days of laser spectroscopy, the laser was used primarily as a bright, narrowband light source, but coherence in the sample was not generally exploited. It is clear

that coherence in the sample is now beginning to play a role comparable to the role it plays in nuclear magnetic resonance.

Since this conference is typically held in the United States or Canada every four years, it is useful to record how the conference was run. It was held in Hot Springs, Virginia, where there are few distractions other than the natural surroundings. Consequently, the oral sessions ran from 8:30 to 12:30 each morning and from 5:00 to 6:30 in the afternoon, leaving some part of the afternoons free for a combination of informal discussion and outdoor activities. Poster sessions ran from 8:00 to 11:00 in the evening, and were very successful. Every evening they were attended until midnight. The unavoidable conclusion is that for conferences held in isolated places having poster sessions in the evening works very well!